Space Weather Forecast

Issued on Saturday, 23 April 2022 at 01:23 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Moderate flares (R1/R2 Radio Blackouts) expected with a slight chance of strong flares (R3 Radio Blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate, with two Moderate flares observed. These have originated from the more northernmost of two relatively large regions in the north centre disc. These two sunspot regions form a complex region with the potential for further flares, with the northernmost spot in particular showing a potentially unstable magnetic field configuration. The southernmost of these regions, however, is showing some limited signs of decay. Elsewhere on the Sun, there are currently six other sunspot regions. These are all smaller and simpler, and showing little activity, but will need to be monitored for any further development. No Earth-directed CMEs (coronal mass ejections) have been observed over the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind speed has been slightly elevated through the last 24 hours between 430-470 km/s. The strength of the interplanetary magnetic field carried by the wind remained weak with the north-south component of the magnetic field also only varying weakly. The resultant geomagnetic activity was Quiet.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar Activity is expected to be Moderate, with further Moderate flares, most likely from the northernmost of the two large central disc sunspots. There is a slight chance of this increasing to High due to an isolated strong flare.

Solar Wind / Geomagnetic Activity: A CME which left the Sun on the 21st due a Moderate flare has a low chance to give a glancing interaction on the 24th. Otherwise, solar winds are forecast to ease day 1 (23rd) before likely becoming slightly enhanced day 2 (24th) due to the arrival of the fast wind of a coronal hole. These elevated solar winds then easing day 3 (25th onward). Geomagnetic activity is forecast to be mostly Quiet with isolated Unsettled intervals. A spell of Unsettled to Active is possible with the arrival of the coronal hole fast wind, most likely day 2 (23rd or 24th). There is a slight chance of G1/Minor Storms, most likely if this is alongside any glancing CME arrival.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to remain at background with no solar radiation storms occurring. The risk of solar radiation storms, although remaining very low, increases through the period as the complex sunspot regions on the Earth-facing disc move across the northwest disc. This is due to them moving into a position where any energetic particles that are released from any flares that occur are more likely to be observed at Earth.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	20	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	70	70	70
Very Active	R3 to R5 X	No	20	15	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	15	15
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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